Katherine Properties, LLC & Janet K. Richardson Pearson Property

City of Annapolis, Maryland

WSSI #MD1213.01

Amendment to the March 2013 Forest Stand Delineation Report

February 19, 2016

Prepared for:
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Prepared by:

Wetland Studies and Solutions, Inc.®
a DAVEY company

2-19-16

Kenneth R. Wallis Date
(Qualified Professional per COMAR 08.19.06.01)

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CERTIFICATION

This is an amendment to the original Forest Stand Delineation (FSD) Report for the Katherine Properties, LLC and Adjacent Parcels which was accepted as "complete and correct" by DNEP on March 21, 2013. The 111.04 acre area included in the March 21, 2013 FSD is herein referred to as the "Original FSD Area." This amendment additionally includes a 76.10 acre area (the "Additional FSD Area") of parcel 1R as shown in Plat Book 303, Page 26, located immediately to the southeast of the Original FSD Area. Together, the Original FSD Area and Additional FSD Area are herein referred to as the "Property." Approximately 34.60 acres of the Additional FSD Area is located outside of the Critical Area, and therefore subject to the requirements of the State Forest Conservation Act (FCA). This amendment complies with the requirements of the Annotated Code of Maryland, Natural Resources Article (the "Code"), §5-1604, 08.19.04.02 of the Code of Maryland Regulations ("COMAR"), the Maryland Department of Natural Resources *State Forest Conservation Technical Manual,* Third Edition, 1997 (the "Manual"), Chapter 2: Forest Stand Delineations. Contained herein are the submittal requirements set forth in the Full FSD Checklist found on page 2-15 of the Manual. As required, this FSD contains a Site Vicinity Map, an Environmental Features Map, and a Forest Stand Analysis.

The preparer is a Qualified Professional under COMAR 08.19.06.01.

Signed: _____
Kenneth R. Wallis

INTRODUCTION

The FSD describes the forest resources and related environmental features associated with the property under evaluation. "The purpose of the FSD is to determine the most suitable and practical areas for forest conservation during the preliminary design and review stages of development. It uses a combination of resource mapping and field assessment to inventory and describe existing forest and locate priority areas for retention, reforestation, or affectation on the site." Manual at page 2-1.

Following acceptance of the FSD as "complete and correct", a Forest Conservation Plan (the "FCP") will be submitted for approval as required by §5-1605 of the Code, COMAR 08.19.04.03 and .04, and Chapter 3 of the Manual. Among other requirements, the FCP will address forest protection techniques, and reforestation and afforestation, if any. Accordingly, an important component of the FSD is the identification of priority areas for retention and protection as defined in the Code, COMAR and the Manual. Requirements associated with defining and addressing priority retention areas are found in the following sections of the Code, COMAR and the Manual:

Section 5-1607 (c) of the Code provides:

> Priority for retention and protection. --
>
> (1) The following trees, shrubs, plants, and specific areas shall be considered priority for retention and protection, and they shall be left in an undisturbed condition unless the applicant has demonstrated, to the satisfaction of the State or local authority, that reasonable efforts have been made to protect them and the plan cannot reasonably be altered:
>
> (i) Trees, shrubs, and plants located in sensitive areas including 100-year floodplains, intermittent and perennial streams and their buffers, coastal bays and their buffers, steep slopes, and critical habitats;
>
> (ii) Contiguous forest that connects the largest undeveloped or most vegetated tracts of land within and adjacent to the site.
>
> (2) The following trees, shrubs, plants, and specific areas shall be considered priority for retention and protection, and they shall be left in an undisturbed condition unless the applicant has demonstrated, to the satisfaction of the State or local authority, that the applicant qualifies for a variance under § 5-1611 of this subtitle:
>
> (i) Trees, shrubs, or plants identified on the list of rare, threatened, and endangered species of the U.S. Fish and Wildlife Service or the Department;
>
> (ii) Trees that are part of a historic site or associated with a historic structure or designated by the Department or local authority as a national, State, or local Champion Tree; and
>
> (ii) Trees having a diameter measured at 4.5 feet above the ground of:
>
> 1. 30 inches; or
>
> 2. 75% of the diameter, measured at 4.5 feet above the ground, of the current State Champion Tree of that species as designated by the Department.

COMAR 08.19.04.03 provides in part as follows:

> B. If existing forest on the site subject to a forest conservation plan cannot be retained, the applicant shall demonstrate to the satisfaction of the Department:

(1) How techniques for retention have been exhausted;

(2) Why the priority forests and priority areas specified in Natural Resources Article, §5-1607(c)(1), Annotated Code of Maryland, are not being retained:

(a) If priority forests and priority areas cannot be left undisturbed, how the sequence for afforestation or reforestation will be followed in compliance with Natural Resources Article, §5-1607(a), Annotated Code of Maryland;

...

E. (2) Any forested nontidal wetland permitted to be cut or cleared and required to be mitigated under Environment Article, Title 9, Annotated Code of Maryland, shall be shown on the forest conservation plan and subtracted on an acre-for-acre basis from the total amount of forest to be cut or cleared as part of a regulated activity, for the purpose of calculating reforestation mitigation under this subtitle;

(3) Nontidal wetlands shall be considered to be priority areas for retention and replacement;

Chapter 3 of the Manual provides more specific standards and minimum requirements for the FSD and the FCP including further refinement how certain priority retention areas, such as contiguous forests are identified. Adding to the Code definition of continuous forest for identification purposes, page 3-5 of the Manual states: "Contiguous forest is either 100 acres or larger, or is 300 feet or more in width and connects to forest area located offsite that is 100 acres or more."

The Manual also contains requirements for the FCP related to the retention and protection of priority areas, and page 3-6 of the Manual provides, in part, as follows:

...the applicant must demonstrate that:

a. All techniques for retention of these areas have been exhausted;

b. Why these areas cannot be left undisturbed; and

c. How reforestation will be accomplished, and, where on the site in priority areas, afforestation or reforestation will be located, if required (see Section 3.1.3 for explanation of afforestation and reforestation threshold requirements).

This demonstration shall contain:

A statement addressing these questions signed by the applicant and appended to or on the FCP map, and
Certification by the preparer of the FCP.

If contiguous forest will be disturbed, the applicant must identify the retention priority of its composite stands according to water quality, wildlife habitat benefits (Section 2.2), and landowner objectives.

In accordance with the foregoing, identification of where priority retention areas exist, if they exist at all, is an important element of both the Environmental Features Map and the Forest Stand Analysis of the FSD. A significant component of the FCP will be an explanation of how all such priority areas are to be addressed.

SITE LOCATION AND CONDITIONS

The 76.10-acre Additional FSD Area is located west of the intersection of Forest Drive and Mas Que Farm Road in the City of Annapolis (Figure 1). The Property including the Additional FSD Area is bordered by Spa Road to the east and is bisected by Mas Que Farm Road. Currently, the Additional FSD Area is a mix of fallow agricultural fields, forest and an equestrian center along Mas Que Farm Road.

SOILS

The updated soil survey for the Property that can be assessed online indicates the presence of four (4) additional soil types on the Additional FSD Area: Annapolis fine sandy loam (AsC), Colemantown-Urban land complex (CnB), Donlonton fine sandy loam (DnB), Donlonton-Urban land complex (DuB). Although none of the soil types are classified as hydric by the USDA Soil Conservation Service, the Colemantown fine sandy loam (CkA), Donlonton fine sandy loam (DnA), Donlonton fine sandy loam (DnB) and Widewater and Issue (WBA) soil types may contain hydric soil inclusions. The soil descriptions are listed in Table 1, along with the erodibility factors for each. Soils are considered highly erodible if the K-factor exceeds 0.35.

SOILS TABLE					
Map Unit Symbol	Map Unit Name	Hydrologic Soil Group	Drainage Class	K Factor Whole Soil	Hydric Rating
AoB	Annapolis loamy sand, 2 to 5 percent slopes	C	Well drained	0.17	0%
AoC	Annapolis loamy sand, 5 to 10 percent slopes	C	Well drained	0.17	0%
AsB	Annapolis fine sandy loam, 2 to 5 percent slopes	C	Well drained	0.24	0%
AsC	Annapolis fine sandy loam, 5 to 10 percent slopes	C	Well drained	0.24	0%
AsE	Annapolis fine sandy loam, 15 to 25 percent slopes	C	Well drained	0.24	5% Predominantly non-hydric
AuB	Annapolis-Urban land complex, 0 to 5 percent	C	Well drained	0.24	0%

	slopes				
CkA	Colemantown fine sandy loam, 0 to 2 percent slopes	C/D	Poorly drained	0.17	95% Predominantly hydric
CnB	Colemantown-Urban land complex, 0 to 5 percent slopes	C/D	No rating	No rating	50% some hydric inclusions
CRD	Collington and Annapolis soils, 10 to 15 percent slopes	B	Well drained	0.17	0%
DnA	Donlonton fine sandy loam, 0 to 2 percent slopes	D	Moderately well drained	0.24	5% Predominantly non-hydric
DnB	Donlonton fine sandy loam, 2 to 5 percent slopes	D	Moderately well drained	0.24	5% Predominantly non-hydric
DuB	Donlonton-Urban land complex, 0 to 5 percent slopes	D	Moderately well drained	0.24	5% Predominantly non-hydric
WBA	Widewater and Issue soils, 0 to 2 percent slopes, frequently flooded	C/D	Poorly drained	0.37	60% some hydric inclusions

STEEP SLOPES

In Section 17-04-830 of the City Code, steep slopes are defined as areas greater that 15% grade. The only steep slopes, identified within the Additional FSD Area, are located along the southern boundary of the Additional FSD Area.

100-YEAR FLOODPLAIN

The Manual defines a 100-year floodplain as areas inundated at the one-percent flood frequency and comprising a watershed of 400 acres or more or which include Class III Natural Trout Waters. There are no 100-year floodplains on the Additional FSD Area or the Property.

PERENNIAL AND INTERMITTENT STREAMS

The Manual directs that if an intermittent stream is depicted on the most recent 7.5 minute topographic quadrangle published by the United States Geological Survey ("USGS") or is shown on the published Soil Survey of the Natural Resources Conservation Service (NRCS - formerly the Soil Conservation Service), it must be shown on the FSD Environmental Features Map. Neither the Quad Sheet nor the Soil Survey depicts perennial or intermittent stream channels on the Property, so no streams are required to be shown on the updated FSD Environmental Features Map. (See Figure 2 for the NRCS Soil Survey and Figure 3 for the USGS 7.5 minute Topographic Quadrangle). However, to be consistent we have added an intermittent stream channel to the FSD as required by the City of Annapolis, Department of Neighborhood and Environmental Programs (DNEP) for a drainage feature that was delineated by Wetland Studies and Solutions Inc. on September 9, 2016.

HYDROLOGY/WETLANDS

The Property is located within the Crab Creek watershed, a Use I waterway established by the

Maryland Department of the Environment ("MDE") under COMAR 26.08.02.08. Crab Creek is a tributary of the South River of the Chesapeake Bay. The entire Additional FSD Area sheet flows in a southerly direction into unnamed tributaries of Crab Creek.

A formal wetland delineation in accordance with the methodologies outlined in the 1987 *Corps of Engineers Wetlands Delineation Manual*[1] and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region* was conducted by Kenneth R. Wallis and Andie Murtha of Wetland Studies and Solutions Inc. on September 9, 2016. The delineation revealed that a wetland/stream system was identified on the southern portion of the Property. The surveyed wetland delineation boundary is depicted on the enclosed Environmental Features Map.

CRITICAL HABITATS - RARE, THREATENED AND ENDANGERED SPECIES

Critical habitats are defined under the Code and COMAR as areas containing rare, threatened or endangered species. See also the Manual at page B-1. In a letter dated, December 4, 2015 the Maryland Department of Natural Resources-Wildlife & Heritage Division determined that there are no records for rare, threatened or endangered species existing on the Property.

CONTIGUOUS FOREST

Contiguous Forest is defined by Section 5-1607 (c) (1) (ii) of the Code and by the Manual (page B-1) as forest that "connects the largest undeveloped or most vegetated tracts of land within and adjacent to" a site. Further, the Manual directs that "Contiguous Forest is either 100 acres or larger, or is 300 feet or more in width and connects to forest area located offsite that is 100 acres or more." Manual at page 3-5. The Additional FSD Area contains approximately 8.26 acres of forest, of which 2.59-acres would be considered contiguous since it is an extension of forest Stands A and D which are described in the Original FSD which was accepted as "complete and correct" by DNEP on March 21, 2013.

INDIVIDUAL TREES

There are no trees, shrubs, or plants on the Additional FSD Area identified on the list of rare, threatened, and endangered species of the U.S. Fish and Wildlife Service or the State.

There were four (4) additional trees identified on the Additional FSD Area that are 30 inches or greater in diameter at 4.5 feet above the ground (Table 1). The surveyed locations of the trees are shown on the enclosed Environmental Features Map. In addition, there were twenty-three (23) trees identified on the Additional FSD Area that were in the 24-29.9-inches range (Table 2). These trees are depicted on the attached Environmental Features Map as well.

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[1] Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual.* Wetlands Research Program Technical Report Y-87-1. Final Report. January.

EQUIPMENT USED

A cruising stick and a diameter tape were used to determine the diameter-at-breast-height (DBH) of the trees tallied. A topographic map provided orientation and point locations. Plot radii for data collection, other than tree species, were found with a 32-foot retractable tape. The trees tallied at each point were selected through the use of a Basal Area 10 Factor (BAF 10) prism.

METHODOLOGY

Data collected from the Property follows the prescribed methodology provided in the Manual.

A. *Preliminary Forest Stand Delineations*

A preliminary FSD Map was produced by overlaying documented characteristics of existing site conditions, including tree line, topography, property boundaries, and structures. Using this map along with an aerial photograph, these stands were visually broken down and data points were located before making a site visit. A minimum of one data point per 4 acres of forest is required with a minimum of 2 data points per stand as required by the State Forest Conservation Technical Manual.

A forest is defined in the Forest Conservation Act at Code, §5-1601 (k) as a biological community dominated by trees and other woody plants covering a land area of 10,000 square feet or greater. A forest must also contain at least 100 trees per acre with at least 50% of those trees having a 2 inch or greater diameter at 4.5 feet above the ground. Forest stands need to have sufficient numbers of individual trees and structural development to function as a forest community.

B. *Field Developed Forest Stand Delineation*

Four (4) stand designations were sufficient to characterize the 8.26 acres of classifiable forest on the Additional FSD Area. Twelve (12) data points were used to collect the required field data. The point centers for each of the data points are indicated on the Environmental Features Map. Each of the twelve data points were marked in the forest with red ribbon, and each ribbon was numbered as is shown on the Environmental Features Map. At each of the points, data was collected to provide a basis for rating the value of the forest community. A BAF 10 prism was used to select trees to be tallied as "in trees". Both live and dead "in trees" had their diameter at 4.5 feet recorded on the Field Sampling Data Sheets to the nearest one inch diameter class.

Forest structure information included data on canopy closure, herbaceous plants, downed woody debris, and invasive plants which were expressed as a percentage of areal coverage. Forest Structure Analysis was calculated from data tallied at each of the point locations. The data were compiled for the different parameters, and each parameter was then assigned a value, thus providing an overall structural value for the stand. The structural value placed the stand in one of three categories: Primary, Good, and Poor.

STAND DESCRIPTIONS

Stand A

Stand A was extended onto Additional FSD Area from the Original FSD Area. The additional stand area is located immediately to the north of the equestrian center. The characteristics of this stand are similar to that which was described in the stand description of the previously accepted March, 2013 Environmental Features Plan and Report for the *Katherine Properties and Adjacent Parcels*. Two additional Forest Stand Delineation Data sheets were completed within this stand. These data sheets document similar forest conditions. The additional data sheets and an updated Forest Stand Summary Table can be found in Appendix B of this report.

Stand D

A portion of Stand D was also extended onto the Additional FSD Area from the Original FSD Area. The additional stand area is also located immediately to the north of the equestrian center. The stand characteristics are the same as was described in the Stand D description of the previously accepted March, 2013 Forest Stand Delineation Plan for The Katherine Properties & Adjacent Parcels. Two additional data sheets were completed within this stand. The additional data sheets and updated Forest Stand Summary Table can be found in Appendix C of this report.

Stand G

Stand Composition and Structure

Stand G comprises approximately 1.57-acres of early successional mixed hardwoods dominated by Virginia pine (*Pinus virginiana*) eastern white pine (*Pinus strobus*) and Norway spruce (*Picea abies*). This forest was planted approximately 15 years ago with the intention of providing a forest buffer on two manmade berms situated along Spa Road. The shrub layer is dominated by bayberry (*Myrica pensylvanica*), which was also planted, with approximately 100 stems per acre. The herbaceous layer is a mix of invasive and native plant species due to the disturbed nature of the stand. The herbaceous layer is generally comprised of Japanese honeysuckle, Allegheny blackberry (*Rubus allegheniensis*), American holly (*Ilex opaca*) and Goldenrod sp. (*Solidago* sp.) The trees in Stand A have an average diameter at 4.5 feet of 8 inches, with an estimated 931 trees per acre. Ten (10) tree species, identified on the attached Field Sampling Data Sheets (Appendix D), were tallied by three (3) data points. No specimen trees were identified within Stand G. The Forest Stand Analysis Sheet indicates that Stand A has a "Good" rating (Structure Value 11).

This stand has a poor structural diversity of canopy, shrub and herbaceous layers. The canopy has an average closure of 40 percent. The shrub layer contains few species due to the fact that most of the larger shrubs were planted. The herbaceous layer contains many native species as

well as invasive species such as Bradford pear (*Pyrus calleryana*), Japanese honeysuckle (*Lonicera japonica*) and multiflora rose (*Rosa multiflora*). Management methods for any trees in good or better condition could include: root pruning, crown pruning, root aeration systems, and fertilizer depending on the tree. Regeneration within the stand will be very limited since there is very limited seed source from this particular stand. Most of Stand G currently contains invasive species which have the potential to take over the stand due to the lack of weed control and shade.

Stand Condition

The regenerative potential of this stand is low since much of this stand is comprised of planted non-native trees species. Many of the tree species are too young to produce seed crops. Stand hydrology is lacking due to the location of stand on a manmade berm. Therefore, the stand is fairly dry. The stand generally drains via sheet flow in a southerly direction once any runoff leaves the berms. Most of the trees are very young and comprised of early successional and or non-native species. There is no evidence of fungi within the stand. It is unlikely that the minor disease and pest problems currently exist within this stand. Many exotic and invasive plant species exist occur within the stand.

No portion of Stand G is a priority area for retention and protection. Stand G is designated on the Environmental Features Map as Sub-Stands G-1, G-2 and G-3. Due to the fact that Stand G is isolated in nature and comprised of non-native and early successional species, it should be considered a Priority 3 (Low) retention area.

Stand Function

The lack of structural diversity within Stand G means it is poor wildlife habitat for forest dwelling species. Stand G has very little value for water quality protection due to its relatively small size. While, Stand G may provide an aesthetic benefit as a visual buffer, it provides minimal benefits for passive recreation in its current state due to its small size and location. Given its urban setting, Stand G has no value as an area for timber production nor does it provide buffering to surface runoff and groundwater flow due to its location on a knoll. Stand G will provide very little mitigating benefits to soil erosion and sediment losses if disturbances do not adequately provide stormwater management. It is unlikely that larger wildlife species frequently use this stand.

Stand H

Stand Composition and Structure

Stand H comprises approximately 4.10-acres of early successional mixed-hardwoods dominated by sweetgum (*Liquidambar styraciflua*) and red maple (*Acer rubrum*). The shrub and herbaceous layers are generally dominated by seedlings and saplings of aforementioned trees plus coralberry (*Symphoricarpos orbiculatus*), autumn olive (*Elaeagnus umbellata*), Japanese honesuckle (*Lonicera japonica*), deertongue grass (*Dichanthelium clandestinum*), rough avens

(*Geum laciniatum*), English ivy (*Hedera helix*), Oriental bittersweet (*Celastrus orbiculatus*), European privet (*Ligustrum vulgaris*), common greenbrier (*Smilax rotundifolia*), wineberry (*Rubus allegheniensis*), Japanese barberry (*Berberis thunbergeii*), *Carex ssp*, and partridgeberry (*Michella repens*). The trees in Stand H have an average diameter-at base-height (DBH) of 11 inches, with an estimated 672 trees per acre. Field Sampling Data Sheets (Appendix E), were tallied by five (5) data points. The Forest Structure Analysis Sheet indicates that this stand has a structure value of 13, which puts it in the "Good" rating.

This stand has a well-developed structural diversity due to the age of the stand. Tree species are naturally regenerating. The canopy has an average closure of 63 percent. The understory layer contains very few shrub species throughout the stand. The herbaceous layer is sparse due to deep leaf litter and lack of sunlight, but does contains some invasive species. Stand H has a well-defined stand structure which should not be adversely affected by disturbance and stress. Management methods for any trees in fair or better condition could include: root pruning, crown pruning, root aeration systems, and fertilization depending on the tree.

Stand Condition

The regenerative potential of this stand is high since most of the trees are at the age where they now produce seed crops. Stand hydrology is mesic since it is situated in upland soils but is relatively flat. The stand generally drains in a southeasterly direction into open pastureland. Stand H is a fairly healthy stand and has good potential for recovering after development related disturbance. It is unlikely that the minor disease and pest problems which currently exist within this stand would be exacerbated by proposed development stresses.

Stand Function

This stand provides habitat for some wildlife species, however, it is limited due to the size and location of the stand. Stand H has some value for water quality protection due to its close proximity to the non-tidal wetlands. In addition, Stand H offers an aesthetic benefit as a forested area and, at certain locations, offers the potential for passive recreation. Given its urban setting, while Stand H has little to no value as an area for timber production, it is generally healthy and regenerating naturally. This stand may provide benefits as a wildlife corridor.

TABLE 1: SPECIMEN TREE TABLE					
No.	***Common Name***	***Scientific Name***	***DBH (inches)***	***Condition Rating***	***Condition/Comments***
S-22	white oak	*Quercus alba*	40	Good	wound at trunk flare, root impacts
S-23	sweetgum	*Liquidambar styraciflua*	31	Fair	Ailanthus growing from base, poor branch attachment, large branch dieback, scaffold branch lot, root compaction
S-24	white oak	*Quercus alba*	32	Fair	root compaction, small wound at base, depressions at trunk base, unbalanced form, large branch dieback throughout
S-A	scarlet oak	*Quercus coccinea*	30	Fair	canker at trunk base, potential fungus on base (out of season-stain evident), lean, epicormic shoots, co-dominant leader, asymmetrical crown, twig dieback, bulge at base
S-B	white oak	*Quercus alba*	30	Fair	bulge at root flare, slight lean, woodpecker holes, poor branch attachment, unbalanced crown, root impact, dead branches throughout crown
S-C	white oak	*Quercus alba*	39	Fair	exposed roots, root impacts, slight lean, unbalanced form, epicormics growth on scaffold branches, branch and twig dieback
S-D	silver maple	*Acer sacchainum*	37	Fair	co-dominant leader, included bark at split, asymmetrical crown, rotting scaffold branches
S-E	willow oak	*Quercus phellos*	30	Fair	3 leaders, visible dieback, rotting scaffold branches, epicormics shoots, included bark at split, dieback, canker, shallow rooting on hillslope
S-F	sweetgum	*Liquidambar styraciflua*	35	Fair	co-dominant leader, vine cover, branch dieback throughout crown, wound on lower trunk, barbwire fence in truck, depressions on lower trunk, included bark, poor form
S-G	southern red oak	*Quercus falcata*	30	Fair	bulge and depression at trunk base, fungus, rotting lower branches, crown dieback, heavy vine cover, epicormics shoots, 25% of crown contains dead branches

TABLE 2: SIGNIFICANT TREE TABLE (24-29.9")					
No.	***Common Name***	***Scientific Name***	***DBH (inches)***	***Condition Rating***	***Condition/Comments***
A-173	chestnut oak	*Quercus prinus*	26	Fair	slight lean, dead branches throughout crown
T-1	white oak	*Quercus alba*	24	Fair	large branch and twig dieback, narrow crown, co-dominant leader, root impacts from dirt roadway
T-2	white oak	*Quercus alba*	28	Fair	lopsided crown, branch and twig dieback throughout crown, epicormics shoots, visibly cavity, fungus/rot on underside of broken branches
T-3	southern red oak	*Quercus falcata*	27	Good	lean, narrow crown, co-dominant leader
T-4	sweetgum	*Liquidambar styraciflua*	28, 24	Poor	root impacts, cavity at base, co-dominant, including bark at split, broken scaffold branches, lopsided crown, poor form, potential hazard to facility users
T-5	southern red oak	*Quercus falcata*	24	Good	root impacts, significant lean, one sided crown, dead scaffold branches, dead branches and twigs
T-6	white oak	*Quercus alba*	28	Good	girdled root, inclusion at branch attachment
T-7	chestnut oak	*Quercus prinus*	27	Fair	also A-102, co-dominant leader, included bark at split, poor form, broken branches
T-8	red maple	*Acer rubrum*	29	Good	depression on lower trunk, small cavity at base, crooked bole
T-9	sweetgum	*Liquidambar styraciflua*	26	Fair	root impacts, slight lean, asymmetrical for, large broken branches throughout
T-10	red maple	*Acer rubrum*	29	Poor	very large cavity at base, visible rot multiple locations on lower trunk, included bark, twisted leader, extremely poor form, broken branches throughout, epicormic shoots
T-11	yellow-poplar	*Liriodendron tulipifera*	26, 25	Fair	co-dominant leader, depressions on lower trunk, slight lean, large cavity, poor branch attachment, poor form
T-12	sweetgum	*Liquidambar styraciflua*	26	Fair	included bark at branch unions, twig dieback, dead scaffold
T-13	southern red oak	*Quercus falcata*	24	Fair	root compaction, vine cover, lean, fungus on rotting branches in crown, twig/branch dieback
T-14	sweetgum	*Liquidambar styraciflua*	24	Fair	heavy vine cover, twig/branch dieback throughout, lob crown
T-15	black gum	*Nyssa sylvatica*	26	Fair	poor form, vine cover
T-16	southern red oak	*Quercus falcate*	24	Fair	fungus, dead scaffold branches, dieback, narrow crown

T-17	red maple	*Acer rubrum*	24	Good	slight lean, included bark
T-18	red maple	*Acer rubrum*	25	Good	slight lean, small cavity at trunk base
T-19	red maple	*Acer rubrum*	29	Good	depressions in bark, broken scaffold branches, co-dominant leader, lopsided crown
T-20	pin oak	*Quercus palustris*	28	Poor	crack in lower trunk, root compaction, crown dieback, fungus, large dead branches throughout crown
T-21	sweetgum	*Liquidambar styraciflua*	25	Good	broken lower scaffold branch
T-22	willow oak	*Quercus phellos*	26	Good	roots impacted by road, lopsided form, bark inclusions, slight lean
T-23	eastern red cedar	*Juniperus virginiana*	26	Fair	vine cover, roots impacted by driveway, codominant leader at 2', poor pruning cuts, girdled roots, asymmetrical crown due to pruning, poor form, crossing branches in canopy

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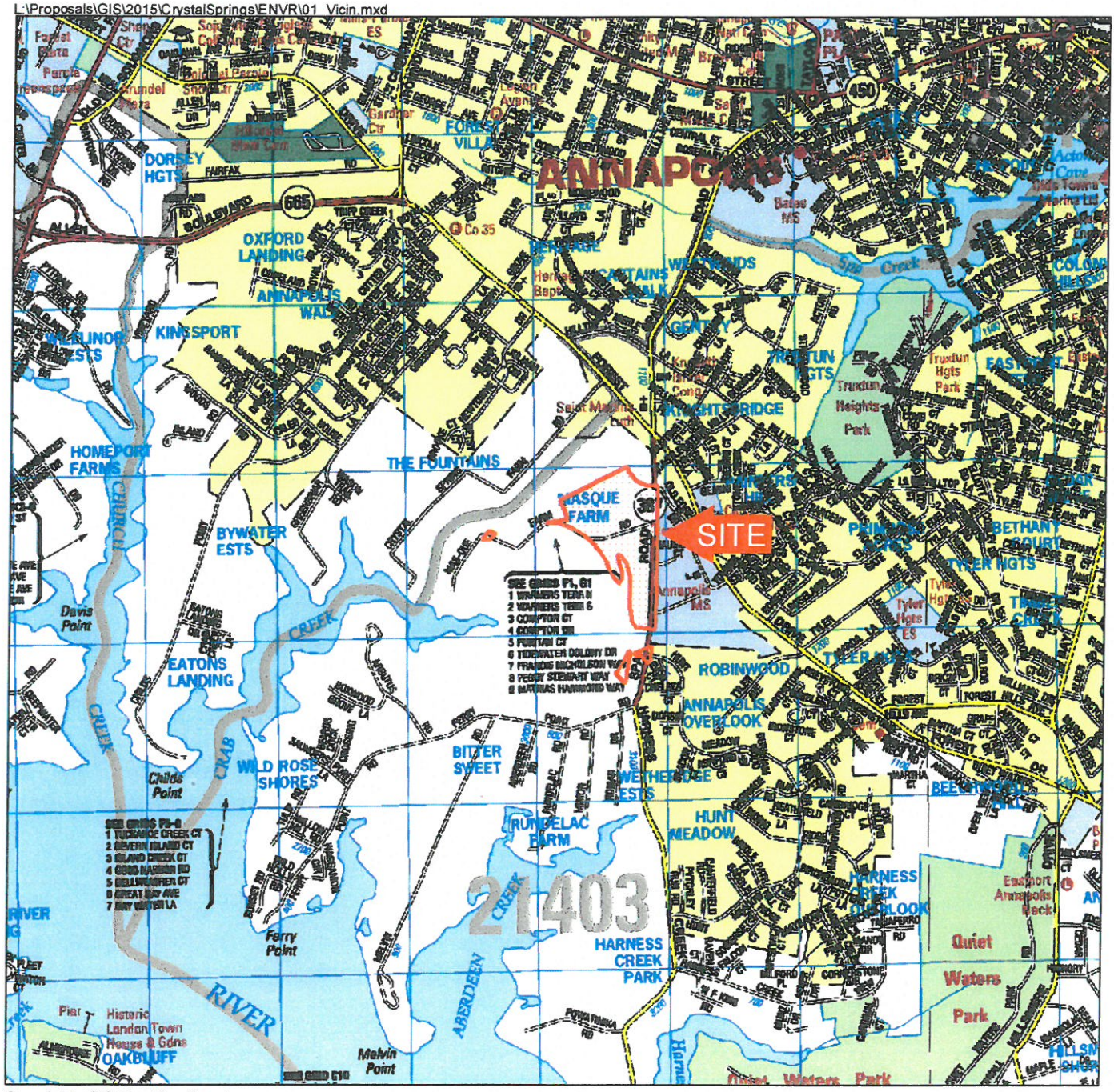
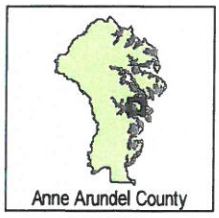
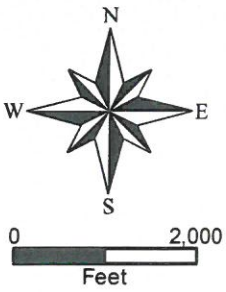


Vicinity Map
Crystal Springs
Original Scale: 1" = 2000'





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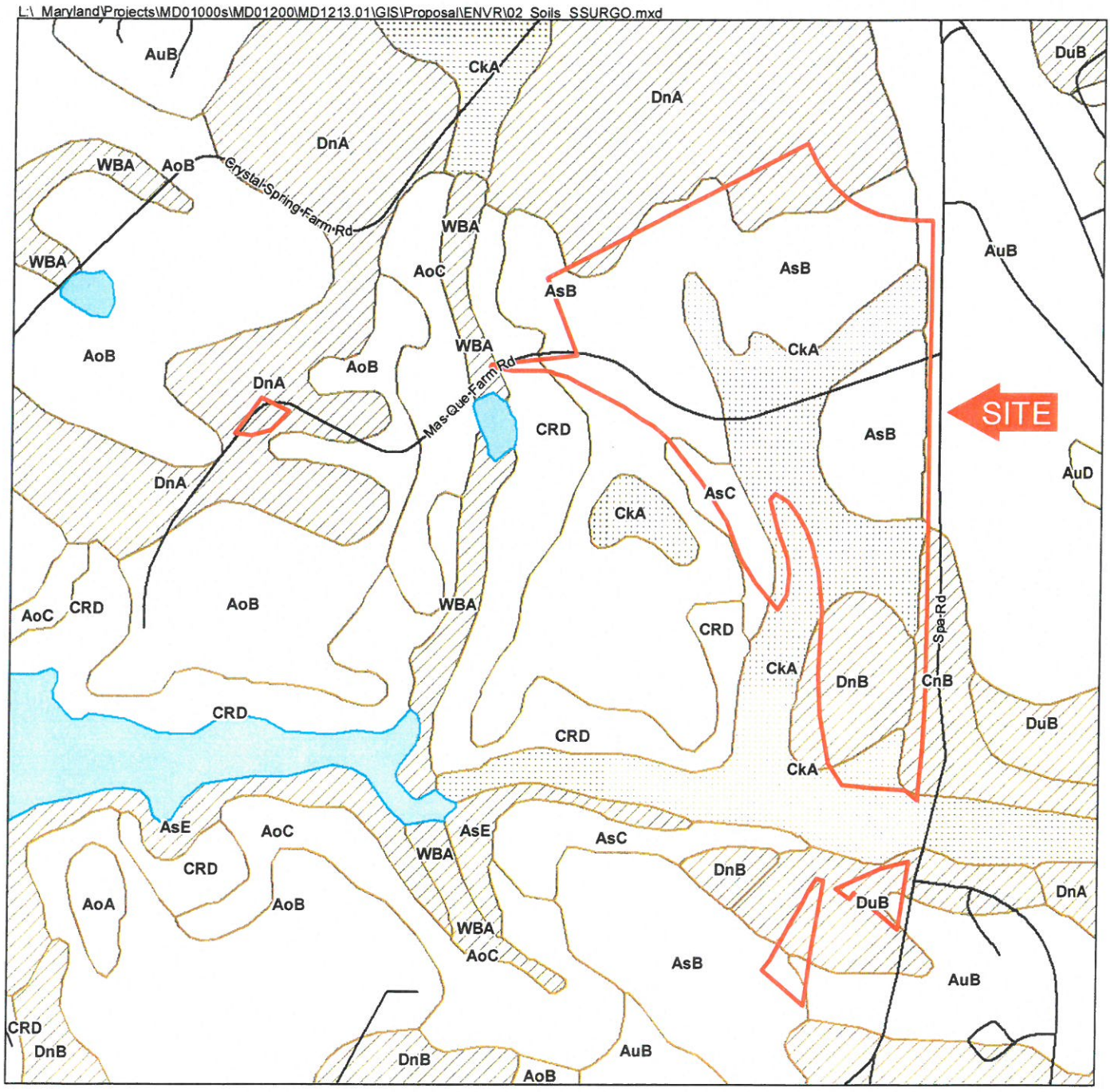
a DAVEY company

Figure 1



Soils Map
SSURGO Digital Data
Crystal Springs
Original Scale: 1" = 500'

Wetland Studies and Solutions, Inc.
a DAVEY company

Figure 2

APPENDIX A

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, *Governor*
Boyd Rutherford, *Lt. Governor*
Mark Belton, *Secretary*
Joanne Throwe, *Deputy Secretary*

December 4, 2015

Andie Murtha
Wetland Studies and Solutions, Inc.
8373 Piney Orchard Parkway, Suite 207
Odenton, MD 21112

RE: Environmental Review for Janet Richardson Property, Spa Road, Annapolis, Crystal Springs Development LLC, Anne Arundel County, MD.

Dear Mr. Murtha:

The Wildlife and Heritage Service has determined that there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated. As a result, we have no specific comments or requirements pertaining to protection measures at this time. This statement should not be interpreted however as meaning that rare, threatened or endangered species are not in fact present. If appropriate habitat is available, certain species could be present without documentation because adequate surveys have not been conducted.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2015.1652.aa

APPENDIX B

FOREST STAND SUMMARY SHEET

Stand: A

Site: Crystal Spring Farm Preparer: K.Wallis
Date: 11/11/15 Acreage:

Pts/Stand 16

Average DBH:	15
Number of Trees/Acre:	377
Number of Tree Species:	18
Basal Area/Acre:	152
Number of Dead Trees/Acre:	14
Number of Shrubs/Acre:	369
% Canopy Cover:	90
% Herbaceous Cover:	17
% Downed Woody Material:	4
% Exotic or Invasive Species:	7

% Dominance By Species For Stand A

Species	# Tallied	% Dominance
Io	31	13%
Qa	81	33%
Qph	3	1%
Ar	12	5%
Ls	39	16%
Pv	5	2%
Ns	11	5%
Ct	8	3%
Ps	1	0%
Qpal	4	2%
Qr	2	1%
Qf	17	7%
Qv	5	2%
Qpr	12	3%
Lt	1	0%
Fg	4	1%
Qc	6	2%
Cf	1	0%
Total	115	100%

Forest Structure Analysis

(As an average per acre for the stand)

Stand Designation **A** Structure Value **12**

The following parameters comprise an average of data collected at each point for the stand indicated above. The parameters, when combined, give a general representation of the condition and value of the stand.

The total structure value is defined by:
15-21 Priority
7-14 Good
0-6 Poor

Percent Canopy Closure	
70-100%	3
40-69%	0
10-39%	0
0-9%	0

Number of Shrubs per Acre	
600 or more	0
400-599	0
200-399	1
0-199	0

Percent Woody Debris	
15-100%	0
5-14%	0
1-4%	1
Less than 1%	0

# Standing Snags per Acre	
30 or more	0
20-29	0
10-19	1
0-9	0

Size Class of Dominant Trees	
Greater than 20"	0
6-19.9"	2
3-5.9"	0
Less than 3"	0

Percent Herbaceous Cover	
75-100%	0
25-74%	0
5-24%	1
0-4%	0

# of Tree Species >=6"	
6 or more	3
4-5	0
2-3	0
0-1	0

Forest Stand Delineation
Field Sampling Data Sheet

Property: _____ Prepared by: K. Wallis

Stand: A Sample Point: AM Date: 15/11/15

Species	Tallied DBH		
wh. oak	39, 16, 28	Diameter of dead trees ≥6" DBH tallied at sample point	16, 12
black gum	21	Percent canopy cover at sample point	80
sweet gum	15		
q. coccin	21	Percent herbaceous cover at 1/100th acre plot	10
q. ~~the~~ primus	19, 21		
1. opaca	10	Percent downed woody debris ≥6" diameter at 1/10th acre plot	2
Q. Falcata	18		
		Percent invasive plant cover at 1/100th acre plot	5%
		Number of shrubs per 1/100th acre plot	6

Invasive Species: hedera helix, fescue

Common Understory Species (3'-20') layer: mt. laurel
vaccinium cory. ,Q. alba, Q. coccinea, cornus florida, Ilex, o

Herbaceous Species (0-3' layer):
Ilex opaca, smilax rotundifolia, h. helix, vaccinum, s. glauca
Tiarella cordifolia, mitchela repens, Q falcata

Comments: thick leaf litter

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: _____ Prepared by: K. Wallis

Stand: A Sample Point: B Date: 11-9-15

Species	Tallied DBH		
hickory	8	Diameter of dead trees ≥6" DBH tallied at sample point	16
white oak	22, 38, 24, 28, 12	Percent canopy cover at sample point	80
red maple	18, 6, 19		
southern red oak	16, 27	Percent herbaceous cover at 1/100th acre plot	5
Sweetgum	28, 24, 11, 13, 12, 16, 12		
Flowering dogwood	3	Percent downed woody debris ≥6" diameter at 1/10th acre plot	5
		Percent invasive plant cover at 1/100th acre plot	0
		Number of shrubs per 1/100th acre plot	0

Invasive Species:

–

Common Understory Species (3'-20') layer:

Ilex opaca
Acer rubrum
Cornus florida
Quercus coccinea

Herbaceous Species (0-3' layer):

Carex sp.
Ilex opaca
Smilax glauca
Michella repens

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

APPENDIX C

FOREST STAND SUMMARY SHEET

Stand: D

Site: Katherine Properties Preparer: K. Wallis

Date: 11/15/15 Acreage: 25.54

Pts/Stand 9

Average DBH:	12
Number of Trees/Acre:	755
Number of Tree Species:	17
Basal Area/Acre:	162
Number of Dead Trees/Acre:	2
Number of Shrubs/Acre:	489
% Canopy Cover:	88
% Herbaceous Cover:	22
% Downed Woody Material:	1
% Exotic or Invasive Species:	11

% Dominance By Species For Stand D

Species	# Tallied	% Dominance
Ar	14	10%
Ls	33	23%
Pv	8	5%
Qph	5	3%
Qf	6	4%
Qa	11	8%
Ps	6	4%
Jv	2	1%
Rp	7	5%
Lt	3	2%
Qpal	1	1%
Qpr	14	10%
Io	12	8%
Ns	14	5%
Qc	4	2%
Qv	3	1%
Ct	3	1%
Total	140	100%

Forest Structure Analysis

(As an average per acre for the stand)

Stand Designation **D** Structure Value **12**

The following parameters comprise an average of data collected at each point for the stand indicated above. The parameters, when combined, give a general representation of the condition and value of the stand.

The total structure value is defined by:
15-21 Priority
7-14 Good
0-6 Poor

Percent Canopy Closure	
70-100%	3
40-69%	0
10-39%	0
0-9%	0

Number of Shrubs per Acre	
600 or more	0
400-599	2
200-399	0
0-199	0

Percent Woody Debris	
15-100%	0
5-14%	0
1-4%	1
Less than 1%	0

# Standing Snags per Acre	
30 or more	0
20-29	0
10-19	0
0-9	0

Size Class of Dominant Trees	
Greater than 20"	0
6-19.9"	2
3-5.9"	0
Less than 3"	0

Percent Herbaceous Cover	
75-100%	0
25-74%	0
5-24%	1
0-4%	0

# of Tree Species >=6"	
6 or more	3
4-5	0
2-3	0
0-1	0

Forest Stand Delineation
Field Sampling Data Sheet

Property: Katherine Propert Prepared by: K. Wallis

Stand: D Sample Point: A Date: 11-9-15

Species	Tallied DBH		
sweetgum	17, 6 17, 6, 7, 20, 18, 14, 18, 19	Diameter of dead trees ≥6" DBH tallied at sample point	0
southern red oak	12, 8	Percent canopy cover at sample point	75
Ilex opaca	6, 6, 7, 21		
hickory	7, 10	Percent herbaceous cover at 1/100th acre plot	20
red maple	20, 16, 19, 16		
black gum	8, 4	Percent downed woody debris ≥6" diameter at 1/10th acre plot	3
white oak	40		
willow oak	8	Percent invasive plant cover at 1/100th acre plot	15
		Number of shrubs per 1/100th acre plot	0

Invasive Species:
Lonicera japonica
Celastrus orbiculatus
Ligustrum vulgare

Common Understory Species (3'-20') layer:
Ilex opaca

Herbaceous Species (0-3' layer):
Lonicera japonica
Celastrus orbulatus
Ligustrum vulgare
Smilax rotundifolia
Berberis sp.

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: _____ Prepared by: K. Wallis

Stand: D Sample Point: L Date: 11-11-15

Species	Tallied DBH		
1. OPACA	7, 11, 10, 14	Diameter of dead trees ≥6" DBH tallied at sample point	-0-
Sweet-gum	15, 7, 8, 7	Percent canopy cover at sample point	70
Q Coccinea	9		
C. Tomento	16	Percent herbaceous cover at 1/100th acre plot	15
A. Rub	29, 28		
		Percent downed woody debris ≥6" diameter at 1/10th acre plot	1
		Percent invasive plant cover at 1/100th acre plot	15
		Number of shrubs per 1/100th acre plot	0

Invasive Species: lon. jap; hed. helix, celestrus orb;

Common Understory Species (3'-20') layer:
cutleaf grape fern; ilex opaca, smilax rd., liquidambar sty. carpinus's lon. jap., acer rubrum

Herbaceous Species (0-3' layer): ilex opaca, Liquidambar, carpinus, carol

Comments: also carpinus caroliniana

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

APPENDIX D

FOREST STAND SUMMARY

Forest Stand:	G
Acreage:	0.00
Data Points/Stand:	3
Average DBH:	8
Number of Trees/Acre:	931
Number of Tree Species:	10
Basal Area/Acre:	130
Number of Dead Trees/Acre:	5
Number of Shrubs per Acre:	233
% Canopy Cover:	57
% Herbaceous Cover:	35
% Downed Woody Material:	2
% Exotic or Invasive Species:	17

% Dominance By Species For Stand G

Species	*# Tallied*	*% Dominance*
Pinus virginiana	17	50%
Picea rubens	1	3%
Picea abies	2	6%
Pyrus calleryana	1	3%
Pinus strobus	5	15%
Quercus phellos	1	3%
Quercus falcata	7	21%
Total	**34**	**100%**

FOREST STRUCTURE ANALYSIS

(As an average per acre for the stand)

Stand Designation **G** Structure Value **11**

The following parameters comprise an average of data collected at each point for the stand indicated above. The parameters, when combined, give a general representation of the condition and value of the stand.

The total structure value is defined by:
15-21 Priority
7-14 Good
0-6 Poor

Percent Canopy Closure	
70-100%	0
40-69%	2
10-39%	0
0-9%	0

Size Class of Dominant Trees	
Greater than 20"	0
6-19.9"	2
3-5.9"	0
Less than 3"	0

Number of Shrubs per Acre	
600 or more	0
400-599	0
200-399	1
0-199	0

Percent Herbaceous Cover	
75-100%	0
25-74%	2
5-24%	0
0-4%	0

Percent Woody Debris	
15-100%	0
5-14%	0
1-4%	1
Less than 1%	0

# of Tree Species >=6"	
6 or more	3
4-5	0
2-3	0
0-1	0

# Standing Snags per Acre	
30 or more	0
20-29	0
10-19	0
0-9	0

Forest Stand Delineation
Field Sampling Data Sheet

Property: JANET RICHARDSON Prepared by: K. Wallis

Stand: G Sample Point: J Date: 11-11-15

Species	Tallied DBH		
Pinus strobus	15, 5, 12, 12, 12	Diameter of dead trees ≥6" DBH tallied at sample point	11
Pinus virginiana	4, 6, 6, 6, 4, 3	Percent canopy cover at sample point	50
		Percent herbaceous cover at 1/100th acre plot	40
		Percent downed woody debris ≥6" diameter at 1/10th acre plot	0
		Percent invasive plant cover at 1/100th acre plot	20
		Number of shrubs per 1/100th acre plot	1

Invasive Species:
Lonicera japonica
Pyrus calleryana
Festuca sp.

Common Understory Species (3'-20') layer:
Pyrus callyana Liquidambar styraciflua
Juniperus virginiana

Herbaceous Species (0-3' layer):

Lonicera japonica	Quercus falcata	Grass
Pyrus calleryana	Quercus phellos	Solidago sp.
Festuca sp.	Rubus sp.	Ilex opaca

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: JANET RICHARDSON Prepared by: K. Wallis

Stand: 6 Sample Point: K Date: 11-11-15

Species	Tallied DBH		
red spruce Picea rubens	8	Diameter of dead trees ≥6" DBH tallied at sample point	0
Pinus strobus	16, 7, 4, 14, 4, 4, 15	Percent canopy cover at sample point	30
Picea abies	10, 8		
Bradford pear Pyrus calleryana	3	Percent herbaceous cover at 1/100th acre plot	35
		Percent downed woody debris ≥6" diameter at 1/10th acre plot	3
		Percent invasive plant cover at 1/100th acre plot	20
		Number of shrubs per 1/100th acre plot	1

Invasive Species:

Lonicera japonica fescuea
Pyrus calleryana
Multiflora rose

Common Understory Species (3'-20') layer:

Rosa multiflora Pinus virginiana
Juniperus virginiana Bayberry
Liquidambar styraciflua

Herbaceous Species (0-3' layer):

Lonicera japonica Quercus phellos Festuca Solidago sp.
Rubus sp. Quercus falcata Pinus strobus
Rosa multiflora Pyrus calleryana Ilex opaca

Comments: Planted forest on manmade berm

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: _____ Prepared by: K. Wallis

Stand: G Sample Point: I Date: 11-11-15

Species	Tallied DBH		
Virginia pine	12, 18, 12, 9, 4, 4, 3, 5, 7, 9, 15	Diameter of dead trees ≥6" DBH tallied at sample point	0
willow oak	5	Percent canopy cover at sample point	90
southern red oak	5, 6, 5, 4, 12, 5, 2		
white oak	10	Percent herbaceous cover at 1/100th acre plot	30
black cherry	4, 5, 7		
mulberry (white)	16	Percent downed woody debris ≥6" diameter at 1/10th acre plot	2
		Percent invasive plant cover at 1/100th acre plot	10
		Number of shrubs per 1/100th acre plot	5

Invasive Species:
Lonicera japonica, Autumn olive, Morus alba, Hedera helix, Fescue

Common Understory Species (3'-20') layer:
Autumn olive, Quercus falcata, Liquidamber styraciflua, Pinus virginiana, Coralberry, Viburnum corymbosum

Herbaceous Species (0-3' layer):
Lonicera japonica, Quercus falcata, Ilex opaca, Pyrus calleryana, Quercus phellos, Hedera helix, Ilex opaca

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

APPENDIX E

FOREST STAND SUMMARY

Forest Stand:	H
Acreage:	0.00
Data Points/Stand:	5
Average DBH:	12
Number of Trees/Acre:	681
Number of Tree Species:	10
Basal Area/Acre:	194
Number of Dead Trees/Acre:	5
Number of Shrubs per Acre:	460
% Canopy Cover:	76
% Herbaceous Cover:	39
% Downed Woody Material:	4
% Exotic or Invasive Species:	33

% Dominance By Species For Stand H

Species	*# Tallied*	*% Dominance*
Liriodendron tulipifera	8	9%
Quercus falcata	9	10%
Pinus virginiana	1	1%
Acer rubrum	23	26%
Quercus phellos	4	4%
Prunus serotina	9	10%
Liquidambar styraciflua	36	40%
Total	**90**	**100%**

FOREST STRUCTURE ANALYSIS

(As an average per acre for the stand)

Stand Designation **H** Structure Value **13**

The following parameters comprise an average of data collected at each point for the stand indicated above. The parameters, when combined, give a general representation of the condition and value of the stand.

The total structure value is defined by:
15-21 Priority
7-14 Good
0-6 Poor

Percent Canopy Closure	
70-100%	3
40-69%	0
10-39%	0
0-9%	0

Number of Shrubs per Acre	
600 or more	0
400-599	2
200-399	0
0-199	0

Percent Woody Debris	
15-100%	0
5-14%	0
1-4%	1
Less than 1%	0

# Standing Snags per Acre	
30 or more	0
20-29	0
10-19	0
0-9	0

Size Class of Dominant Trees	
Greater than 20"	0
6-19.9"	2
3-5.9"	0
Less than 3"	0

Percent Herbaceous Cover	
75-100%	0
25-74%	2
5-24%	0
0-4%	0

# of Tree Species >=6"	
6 or more	3
4-5	0
2-3	0
0-1	0

Forest Stand Delineation
Field Sampling Data Sheet

Property: _____ Prepared by: K. Wallis

Stand: H Sample Point: F Date: 11-11-15

Species	Tallied DBH		
Sweetgum	7, 8, 8, 7	Diameter of dead trees ≥6" DBH tallied at sample point	
Yellow-poplar	8, 16, 7, 14, 16	Percent canopy cover at sample point	50
Southern red oak	19		
Virginia pine	22	Percent herbaceous cover at 1/100th acre plot	60
red maple	22		
		Percent downed woody debris ≥6" diameter at 1/10th acre plot	4
		Percent invasive plant cover at 1/100th acre plot	50
		Number of shrubs per 1/100th acre plot	3

Invasive Species:

Wisteria sp. Celestrus orbiculatus
Hedera helix Autumn olive
Lonicera japonica Berberis thunbergii

Common Understory Species (3'-20') layer:

Autumn olive Ilex opaca
Liquidambar styraciflua
Acer rubrum

Herbaceous Species (0-3' layer):

Allium canadense Celestrus orbiculatus Wisteria sp. Vitis sp.
Rubus sp. Autumn olive Polygonum virginica
Asplenium platyneuron Lonicera japonica Ilex opaca

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: _____ Prepared by: K. Wallis

Stand: H Sample Point: G Date: 11-11-15

Species	Tallied DBH		
red maple	7, 16, 21, 9, 4, 21, 6, 12	Diameter of dead trees ≥6" DBH tallied at sample point	9
willow oak	17	Percent canopy cover at sample point	70
sweetgum	16, 25		
black cherry	10, 9, 13, 18	Percent herbaceous cover at 1/100th acre plot	20
White oak	10		
Southern red oak	30	Percent downed woody debris ≥6" diameter at 1/10th acre plot	4
black gum	7		
Yellow-poplar	21, 14	Percent invasive plant cover at 1/100th acre plot	15
		Number of shrubs per 1/100th acre plot	3

Invasive Species:

Ligustrum vulgare
Autumn olive
Lonicera japonica
Garlic mustard
Glechoma hederacea

Common Understory Species (3'-20') layer:

Ligustrum vulgare
Autumn olive

Herbaceous Species (0-3' layer):

Autumn olive
Allium canadense
Lonicera japonica
Garlic mustard
Glechoma hederacea
Cut leaf geraga fern
Smilax rotundifolia

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: JANET RICHARDSON Prepared by: K. Wallis

Stand: H Sample Point: C Date: 11-11-15

Species	Tallied DBH		
Sweetgum	9, 15, 12, 11, 13, 12, 13	Diameter of dead trees ≥6" DBH tallied at sample point	9 10
A. holly	9	Percent canopy cover at sample point	70
red maple	11, 11, 5, 10, 8		
willow oak	30	Percent herbaceous cover at 1/100th acre plot	25
Yellow-poplar	22		
black cherry	13	Percent downed woody debris ≥6" diameter at 1/10th acre plot	1
		Percent invasive plant cover at 1/100th acre plot	30
		Number of shrubs per 1/100th acre plot	6

Invasive Species:

Rubus phoenicolasius
Lonicera japonica
Celestrus orbiculatus
Autum olive

Common Understory Species (3'-20') layer:

Cornus florida
Ilex opaca
Autumn olive

Herbaceous Species (0-3' layer):

Rubus phoenicolasius
Lonicera japonica
Dichanthelium clandestinum
Allium canadense
Cinna arundinacea
Celestrus orbiculatus

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: Janet Richardson Prepared by: K. Wallis

Stand: H Sample Point: D Date: 11-11-15

Species	Tallied DBH		
Sweetgum	11, 13, 17, 11, 12	Diameter of dead trees ≥6" DBH tallied at sample point	7,8
red maple	10, 9, 13, 11	Percent canopy cover at sample point	40
black cherry	8		
		Percent herbaceous cover at 1/100th acre plot	45
		Percent downed woody debris ≥6" diameter at 1/10th acre plot	7
		Percent invasive plant cover at 1/100th acre plot	30
		Number of shrubs per 1/100th acre plot	1

Invasive Species:
Berberis thunbergii
Celastrus orbiculatus
Lonicera japonica
Ligustrum vulgare
Coralberry
Glechoma hederacea

Common Understory Species (3'-20') layer:
Ilex opaca, liquidambar

Herbaceous Species (0-3' layer):
Berberis thunbergii
Celastrus orbiculatus
Rough asters
Lonicera japonica
Ligustrum vulgare
Allium canadense
Solidago sp.
Smilax rotundifolia
Quercus phellos
ground ivy - Glechoma hederacea
vitis
Coralberry

Comments: 2" leaf litter 0-2% slope

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)

Forest Stand Delineation
Field Sampling Data Sheet

Property: JANET RICHARDSON Prepared by: K. Wallis

Stand: B Sample Point: E Date: 11-11-15

Species	Tallied DBH		
Sweetgum	23, 23, 17 17, 9, 15, 6, 13, 10, 13, 13, 15, 7, 6, 14, 18, 19, 13	Diameter of dead trees ≥6" DBH tallied at sample point	8
willow oak	4	Percent canopy cover at sample point	60
White oak	5, 2		
red maple	4, 9, 8, 11, 7	Percent herbaceous cover at 1/100th acre plot	15
u			
		Percent downed woody debris ≥6" diameter at 1/10th acre plot	3
		Percent invasive plant cover at 1/100th acre plot	30
		Number of shrubs per 1/100th acre plot	5

Invasive Species:

Lonicera japonica, Autumn olive, Rosa multiflora
Ligustrum vulgare, Berberis thunbergii, Celestrus scandens
Coralberry, Hedera helix

Common Understory Species (3'-20') layer:

Rosa multiflora
Autumn olive

Herbaceous Species (0-3' layer):

Lonicera japonica, Coralberry, Hedera helix, Ilex opaca
Allium canadense, Autumn olive, Smilax glauca
Ligustrum vulgare, Berberis thunbergii, Celestrus scandens

Comments:

(1/100th acre plot =11.78' radius circle)
(1/10th acre plot = 37.24' radius circle)